

CLAIMS

1. A palpation device comprising:
  - a first palpation assembly including a palpation member and a light source; and
  - 5 a second palpation assembly including a palpation member and light detecting means for detecting light emitted by the light source;
  - 10 wherein at least one of the first and second palpation members is movable with respect to the other member, to palpate a body part disposed therebetween.
2. A palpation device as claimed in claim 1, comprising means for measuring at least one physical parameter of 15 the body part.
3. A palpation device as claimed in claim 2, wherein the physical parameter of the body part is the resistance to deformation in response to an applied force.
- 20 4. A palpation device as claimed in either of claims 2 or 3, wherein the measuring means comprises force measuring sensors for measuring the force applied to the body part to produce a deformation.
- 25 5. A palpation device as claimed in any one of claims 2 to 4, wherein the measuring means comprises software for performing feature recognition and classification.
- 30 6. A palpation device as claimed in any preceding claim, wherein the first and second palpation members are independently moveable.

7. A palpation device as claimed in any preceding claim, wherein at least one of the first and second palpation members is moveable in at least two mutually perpendicular planes of motion, with respect to the body part.

8. A palpation device as claimed in any preceding claim, wherein both palpation members are moveable in three mutually perpendicular planes of motion, with respect to the body part.

9. A palpation device as claimed in any preceding claim, wherein at least one of the first and second palpation members is generally planar.

10. A palpation device as claimed in any preceding claim, wherein the palpation device is for use in minimal access surgery (MAS).

11. A palpation device as claimed in any preceding claim, wherein the first palpation member comprises a light transmitting member.

12. A palpation device as claimed in claim 11, wherein the first palpation member is transparent.

13. A palpation device as claimed in any preceding claim, wherein the light source is embedded in the first palpation member.

14. A palpation device as claimed in any one of claims 1 to 12, wherein the light source is optically coupled to the first palpation member.

15. A palpation device as claimed in any preceding claim, wherein the first palpation member is optically shaped to transmit a substantial part of the light emitted by the light source through a surface of said 5 first member, the surface adapted to be located adjacent the body part.

16. A palpation device as claimed in any preceding claim, wherein the second palpation member comprises a 10 light transmitting member.

17. A palpation device as claimed in claim 16, wherein said light transmitting member is transparent.

15 18. A palpation device as claimed in any one of claims 1 to 15, wherein the second palpation member comprises a light sensitive charge coupled device (CCD).

20 19. A palpation device as claimed in claim 18, wherein the CCD forms the whole of the second palpation member.

20. A palpation device as claimed in claim 18, wherein the CCD is embedded in the second palpation member.

25 21. A palpation device as claimed in claim 18, wherein the CCD is optically coupled to the second palpation member.

30 22. A palpation device as claimed in any one of claims 20 to 21, wherein the CCD is adapted to transduce received light into a 2-dimensional (2-D) pixel array for output to a display device.

23. A palpation device as claimed in any preceding claim, wherein the light source comprises a light emitting diode.

5 24. A palpation device as claimed in any one of claims 1 to 22, wherein the light source comprises optical fibres.

10 25. A palpation device as claimed in any preceding claim, wherein the light detecting means comprises a charge coupled device (CCD).

15 26. A palpation device as claimed in any one of claims 1 to 24, wherein the light detecting means comprises a camera.

27. A palpation device as claimed in any one of claims 1 to 24, wherein the light detecting means comprises an endoscope.

20 28. A palpation device as claimed in any preceding claim, wherein the light detecting means is embedded in the second palpation member.

25 29. A palpation device as claimed in any one of claims 1 to 27, wherein the light detecting means is optically coupled to the second palpation member.

30 30. A palpation device as claimed in any preceding claim, wherein the first and second palpation members are moveable between an insertion position and a use position.

31. A palpation device as claimed in claim 30, wherein, in the insertion position of the first and second palpation members, the palpation device is of reduced dimensions compared to the use position of said palpation members.

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32. A palpation device as claimed in either of claims 30 or 31, wherein the first and second palpation members each comprise at least two planar sub-plates, pivotally coupled together for movement between the insertion and use positions.

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33. A palpation device as claimed in claim 32, wherein a number of separate images of the body part are obtained and are adapted to be patched together using suitable software.

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34. A palpation device as claimed in any preceding claim, wherein the device is adapted to be mounted on a support arm having means for detecting the location and orientation of the palpation device.

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35. A palpation device as claimed in any preceding claim, wherein the light source is adapted to emit light of a frequency in the visible spectrum.

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36. A palpation device as claimed in any preceding claim, wherein the light source is adapted to emit structured light.

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37. A palpation device as claimed in any preceding claim, wherein the light source is adapted to emit light of a frequency in the infra-red spectrum.

38. A palpation device as claimed in any preceding claim, wherein the device further comprises detecting means for detecting motion of at least a portion of the 5 body part relative to at least one of the first and second palpation assemblies.

39. A palpation device as claimed in claim 38, wherein the detecting means is for detecting motion of said 10 portion of the body part relative to the palpation members of at least one of the first and second palpation assemblies.

40. A palpation device as claimed in either of claims 38 15 or 39, wherein the detecting means comprises at least one point of reference.

41. A palpation device as claimed in claim 40, wherein the detecting means comprises a visible grid provided on 20 each palpation member.

42. A palpation simulation device comprising:

a first palpation assembly including a palpation member and a light source; and

25 a second palpation assembly including a palpation member and light detecting means for detecting light emitted by the light source;

wherein at least one of the first and second palpation members is moveable with respect to the other 30 member, to palpate a body part disposed therebetween.

43. A method of palpating a body part, the method comprising the steps of:

providing a first palpation assembly including a palpation member and a light source;

providing a second palpation assembly including a palpation member and light detecting means for detecting  
5 light emitted by the light source;

locating the first and second palpation assemblies with a body part disposed therebetween; and

10 moving at least one of the first and second palpation members relative to said other member, to palpate the body part.

44. A method of simulating palpation of a body part, the method comprising the steps of:

providing a first palpation assembly including a palpation member and a light source;  
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providing a second palpation assembly including a palpation member and light detecting means for detecting light emitted by the light source;

locating the first and second palpation assemblies with a body part disposed therebetween; and  
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moving at least one of the first and second palpation members relative to said other member, to palpate the body part.